

SAPERE Methodology

Towards the Final Version

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- 1 Status & News
- 2 Role of Tools
- 3 Critical Issue & Next Steps



Outline

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Tuning the Methodology

- Documentation more or less complete
- W.r.t. the early version, we
 - completed the description of the all *tasks* and *work products*
 - provided an example of each work product for the crowd steering case study
- We foresee at most few minor changes before the end of M32

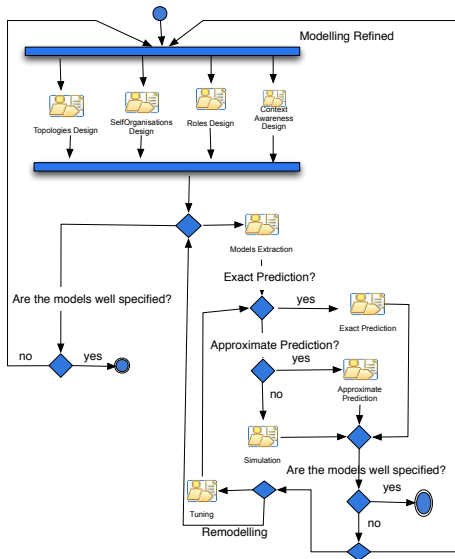


Y3 News

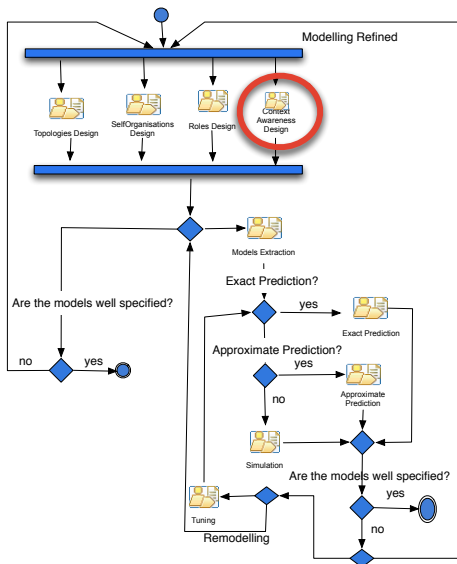
- Thanks to all partners, the methodology was improved
- In particular:
 - introduction of a new activity in the Architectural Design for the design of *Context Awareness*
 - modification of the Implementation process for addressing a more exhaustive test activity
 - introduction of several guidelines



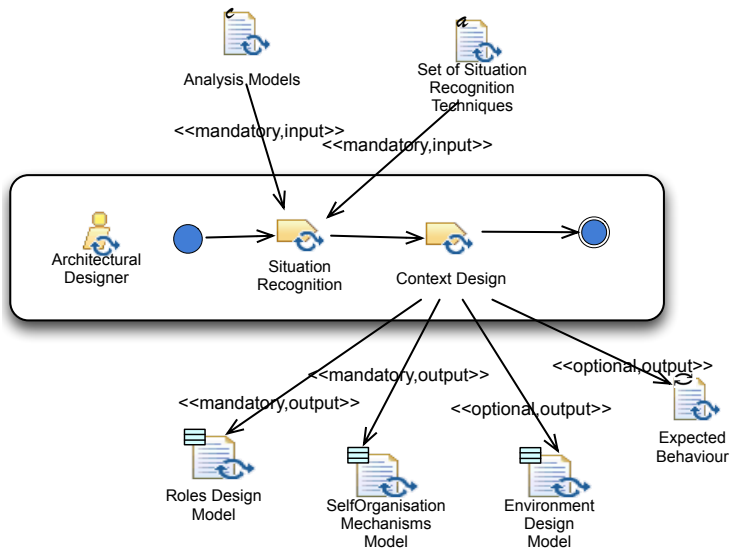
The New Architectural Design Process



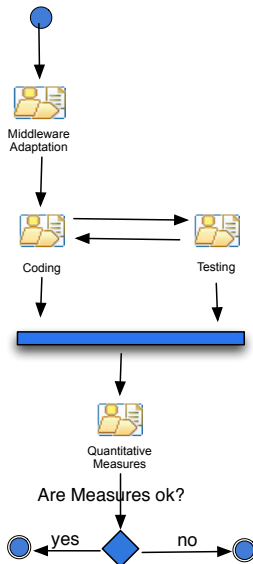
The New Architectural Design Process



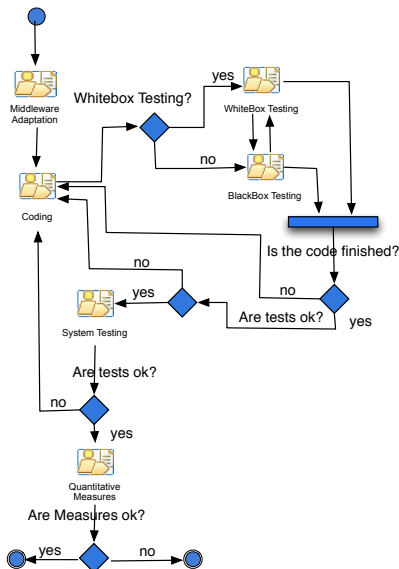
The Context Awareness Design activity



Implementation Process: Old Version



Implementation Process: New Version

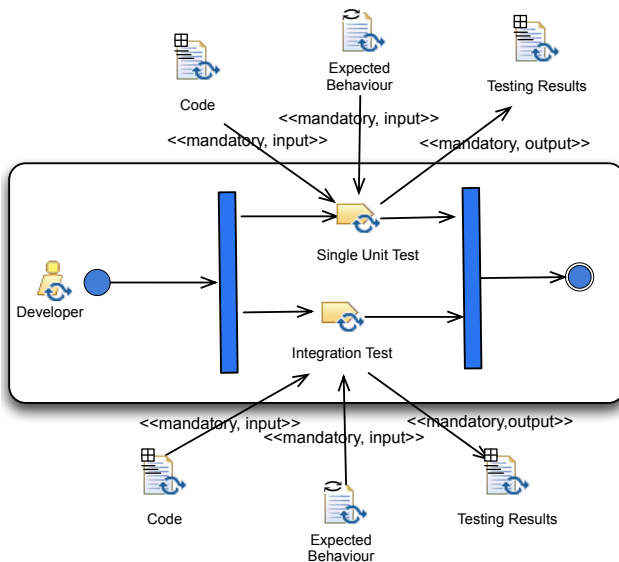


Testing

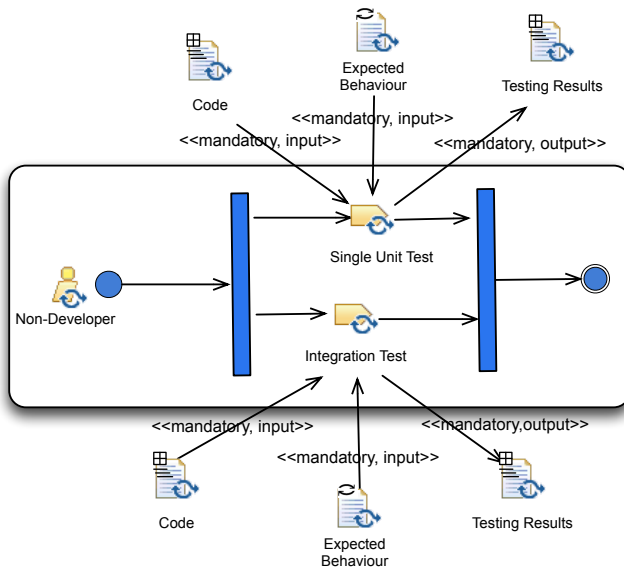
- The major problem related to the testing activities was the creation of suitable *tests suites*
- Due the nature of the SAPERE systems, there was no *single place* in the methodology which tests suite design should belong to
- The introduction of new activities all over the methodology process for addressing the design of tests suites seems not so viable
 - how many activities? One for phases?
 - how many new work products?
- In the end, we choose the following solution:
 - re-use of an existing work product – Expected Behaviour – already used as an input in activities such as Prediction, Simulation, and Verification
 - each process activity can produce a set of tests and *store them* in the Expected Behaviour work product—an optional output of the activities



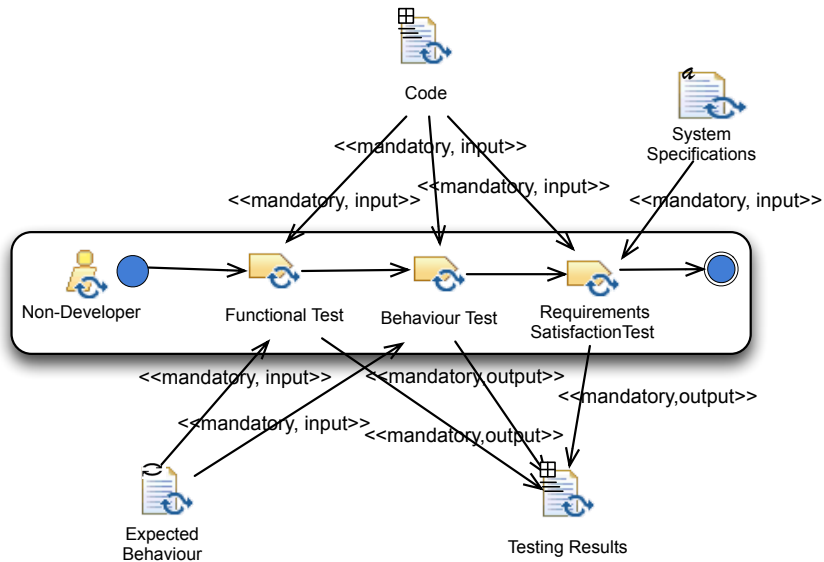
The WhiteBox Testing activity



The BlackBox Testing activity



The System Testing activity



Guidelines: Overall View I

The methodology was enriched with several guidelines:

- Self-Organisation guidelines (*thanks to WP2*)
- Context Awareness guidelines (*thanks to WP3*)
- Simulation guidelines (Alchemist) (*WP1*)
- Prediction guidelines (*WP1*)
- Agent Design guidelines (*thanks to WP5*)
- Verification guidelines (TheOne) (*thanks to WP2*)
- Middleware adaptation guidelines (*thanks to WP4*)
- Coding guidelines (*thanks to WP5*)
- Testing guidelines (*thanks to WP4 and WP5*)



Guidelines: Overall View II

Architectural Design

Four Guidelines

Self-Organisation
Context Awareness
Simulation
Prediction

Detailed Design

Two Guidelines

Agent Design
Verification

Implementation

Three Guidelines

Middleware Adaptation
Code
Testing



Guidelines: Goals I

Self-Organisation guidelines explain how to choose the best self-org pattern from the Pattern Library according to the problem to be solved

Context Awareness guidelines explain how to design context awareness in terms of self-organisation mechanisms

Simulation guidelines explain how to use the Alchemist simulator

Prediction guidelines explain how to apply approximate and exact prediction over the system behaviour

Agent Design guidelines explain how to design agents starting from the Roles Model with a focus on LSA specifications and agents' interactions

Verification guidelines explain how to use the TheOne-SAPERE simulator



Guidelines: Goals II

Middleware adaptation guidelines explain how to move from the SAPERE methodology to the SAPERE middleware—in particular the guideline shows how to manage an Eco-law designed by the methodology and not natively supported in the middleware

Coding guidelines show a first example of code developed in the SAPERE middleware

Testing guidelines suggest several ways for conducting tests, and present a SAPERE middleware tool (SAPERE Middleware Inspector) for the first tests during the implementation



Work Products from Partners

The methodology was enriched with several work products:

- Set of techniques for situation recognition work product (*thanks to WP3*)
- Coding work product (*thanks to WP4*)
- Set of Quantitative Measures work product (*thanks to WP2*)



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Tools

The SAPERE methodology is supported by two tools:

- Alchemist
- TheOne-SAPERE



Alchemist

- Pros

- easy matching among SAPERE methodology abstractions and Alchemist entities
- gradual learning curve

- Cons

- no network-level measures



TheOne-SAPERE

• Pros

- runs the real middleware, real SAPERE code for aspects related to interactions and LSAs
- allows network measures
- realistic scenarios (e.g. urban areas, real traces, real maps, etc.)
- support for heterogeneous nodes (cars, people, public displays) with different mobility patterns, communication interfaces, etc.

• Cons

- not-so-gradual learning curve
- medium scalability: it does not support more than 1000 SAPERE nodes (300-400 with visualisation)



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Critical Point

- Currently we are not able to show an example of the Verification work product for the crowd steering case study
- Verification activity is tied to simulation tasks at the end of the Detailed Design phase
- Here, the methodology suggests the use of the TheOne-SAPERE simulator
- Simulation of the crowd steering case study in TheOne-SAPERE simulator seemed problematic
- UNIGE update: TheOne-SAPERE will actually face the crowd steering case!



Next Steps

- Refinement
 - tests with different case studies (July/September)
 - SAPERE-in-a-box
 - marathon example
 - refinements of the SAPERE methodology process (August/September)
- Documentation
 - final version (July/September)



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